

# PMDA Medical Safety Information

Pharmaceuticals and Medical Devices Agency

**pmda** No. 68 February 2024

## Precautions for Blood Purification in Patients Receiving ACE Inhibitors

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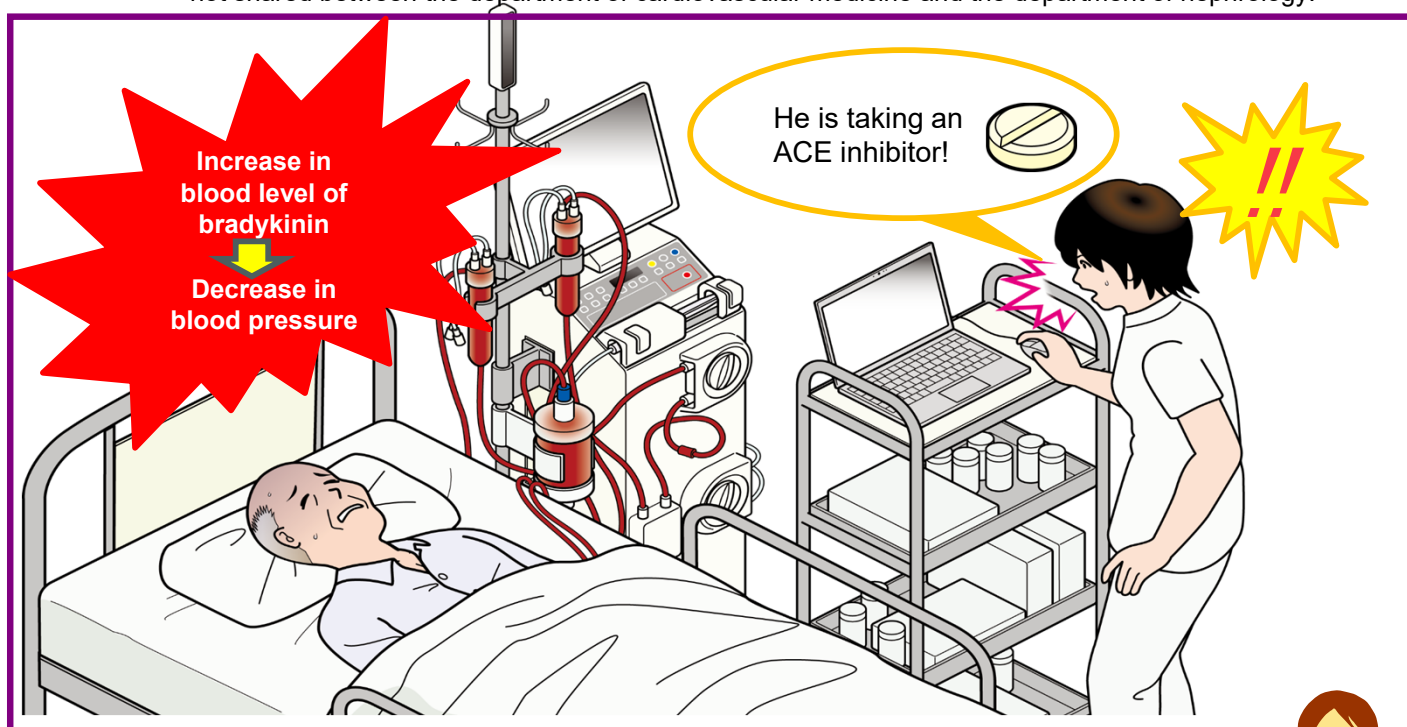
This is a joint project with the Project to Collect Medical Near-Miss/Adverse Event Information by Japan Council for Quality Health Care.

Please also refer to "Medical Safety Information No. 207 of Project to Collect Medical Near-Miss/Adverse Event Information: Use of blood purifiers contraindicated in patients receiving ACE inhibitors (February 2024)."

### 1 Use of blood purifiers contraindicated in patients receiving ACE inhibitors

**(Case 1)** When hemoadsorption therapy was started for a patient with arteriosclerosis obliterans, decreased blood pressure and depressed level of consciousness were observed. The patient had taken an angiotensin converting enzyme inhibitor (ACE inhibitor), which is a contraindicated drug, in the morning of the day of hemoadsorption therapy.

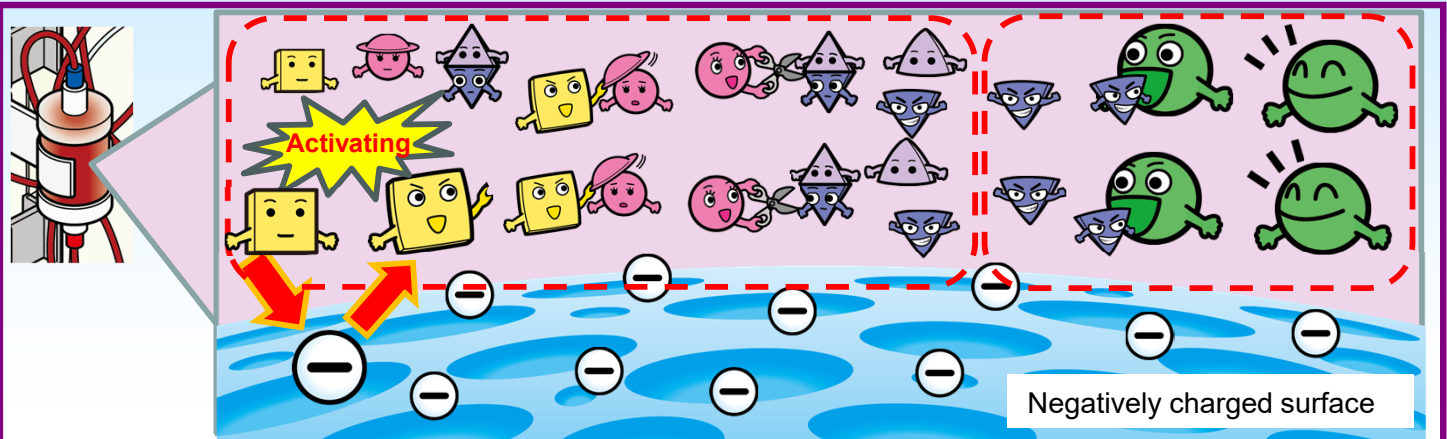
**(Case 2)** When hemoadsorption therapy was performed to improve lower extremity ulcers associated with critical limb-threatening ischaemia, the patient felt poorly and vital signs decreased. The patient had been receiving an ACE inhibitor, which is contraindicated with a blood purifier. Information on the start date of the therapy was not shared between the department of cardiovascular medicine and the department of nephrology.



Some blood purifiers are negatively charged on their surfaces, and they are contraindicated with ACE inhibitors. In addition to ACE inhibitors, caution is required for drugs that have hypotensive effects.  
Pay attention to the medications taken by patients!

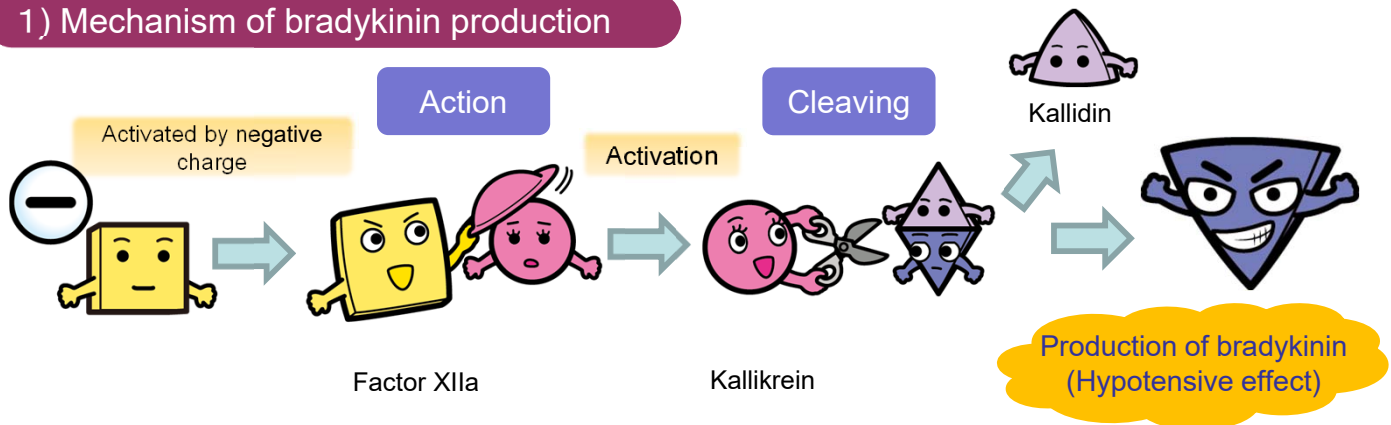


Mechanism of production of bradykinin by a negatively charged blood purifier (negatively charged surface)

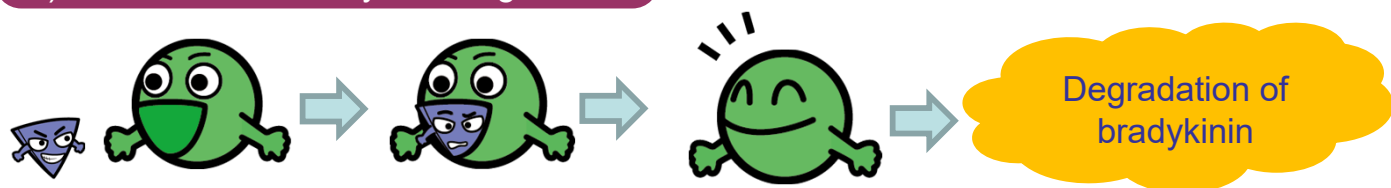


Factor XII      Prekallikrein      High-molecular-weight kininogen      Bradykinin      Kininase II/ACE

1) Mechanism of bradykinin production



2) Mechanism of bradykinin degradation

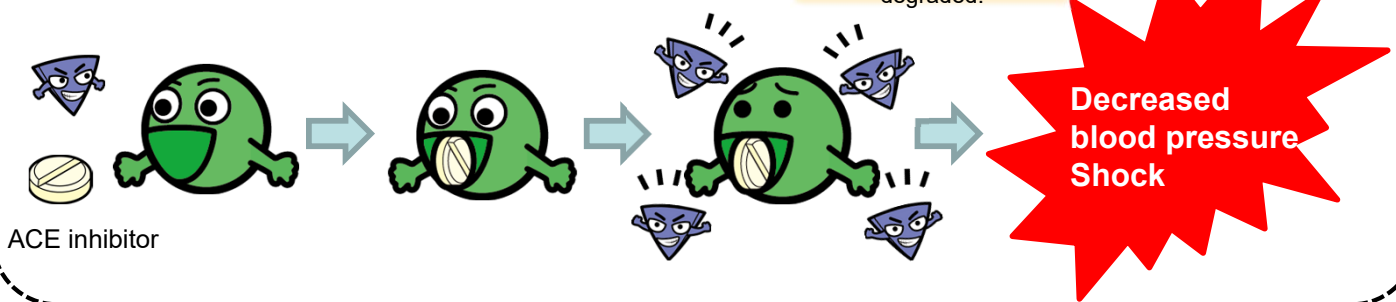


\*Bradykinin is inactivated and degraded by kininase II/ACE.

The interaction between a negatively charged surface and an ACE inhibitor increases the blood level of bradykinin, resulting in decreased blood pressure and shock.

A state in which an ACE inhibitor is administered

Bradykinin cannot be degraded.



Examples of blood purifiers contraindicated in patients receiving ACE inhibitors (as of December 31, 2023)

| Brand name<br>(Japanese Medical Device<br>Nomenclature)     | Materials   | Marketing authorization holder |
|---|---|--------------------------------|
| H12 Hemodialyzer<br>(parallel-plate dialyser)               | Polyacrylonitrile membrane<br>(Acrylonitrile-sodium methallylsulfonate<br>copolymer membrane (AN69 membrane)) | Baxter Limited                 |
| Immusorba<br>(Selective plasma component<br>adsorber)       | Phenylalanine immobilized<br>polyvinylalcohol gel   | Asahi Kasei Medical Co., Ltd   |
| Immusorba TR<br>(Selective plasma component<br>adsorber)    | Tryptophan immobilized<br>polyvinylalcohol gel  |                                |
| Selesorb<br>(Adsorption plasma perfusion<br>column)         | Dextran sulfate immobilized cellulose gel   | Kaneka Corporation             |
| Liposorber<br>(Adsorption plasma perfusion<br>column)       |   |                                |
| Liposorber LA-15<br>(Adsorption plasma perfusion<br>column) |   |                                |
| Rheocarna<br>(Adsorption hemoperfusion<br>column)           | Dextran sulfate and L-tryptophan<br>immobilized cellulose beads   |                                |

Examples of ACE inhibitors

| Nonproprietary name    |                         |                          |
|------------------------|-------------------------|--------------------------|
| Alacepril              | Imidapril hydrochloride | Enalapril maleate        |
| Captopril              | Quinapril hydrochloride | Temocapril hydrochloride |
| Delapril hydrochloride | Trandolapril            | Benazepril hydrochloride |
| Perindopril erbumine   | Lisinopril              | Cilazapril               |

\*Described based on the Administrative Notice dated June 15, 2005 "Revision of Precautions."



**The package inserts of the above blood purifiers and ACE inhibitors state that concomitant use of blood purification therapy using the above materials and ACE inhibitors is contraindicated because it may cause shock. The above descriptions provide examples; therefore, pay attention to the latest information!**

## Points to consider for patients receiving ACE inhibitors when blood purification therapy is performed

### Package inserts of blood purifiers



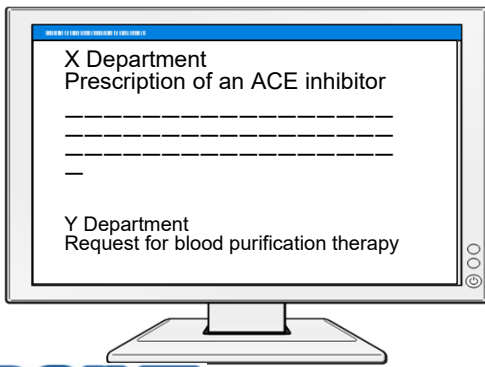
【Contraindications】

【Shape, Structure, Functional Principle(s), etc.】

【Precautions】 Interactions

Contraindicated drugs, clinical symptoms, mechanisms, etc. are described in [Contraindications] and [Precautions] Interactions in the package insert. In addition, the materials are described in [Shape, Structure, Functional Principle(s), etc.], so make sure to look at these sections!

### Electronic medical records and information sharing between clinical departments



### POINT Key points for safe use

- Medications taken by patients should be confirmed with electronic medical records, etc.
- For blood purification therapy, make sure to confirm the medications taken by patients and share the information between clinical departments/professions including physicians, pharmacists, nurses, and technicians before performing the therapy, because the therapy may be requested by other departments.

Administrative Notices related to this "PMDA Medical Safety Information No. 68" have been issued by the Ministry of Health, Labour and Welfare.

- "Adverse Drug Reaction Information No. 115" as of July 1992
- "Revision of Precautions," Administrative Notice dated June 15, 2005

Please access the link below for "Medical Safety Information No. 207 of Project to Collect Medical Near-Miss/Adverse Event Information: Use of blood purifiers contraindicated in patients receiving ACE inhibitors (February 2024)" issued by Japan Council for Quality Health Care.

[https://www.med-safe.jp/pdf/med-safe\\_207.pdf](https://www.med-safe.jp/pdf/med-safe_207.pdf)

#### About this information

- \* PMDA Medical Safety Information is issued by the Pharmaceuticals and Medical Devices Agency for the purpose of providing healthcare professionals with clearer information from the perspective of promoting the safe use of pharmaceuticals and medical devices. The information presented here has been compiled, with the assistance of expert advice, from cases collected as Medical Accident Information Reports by the Japan Council for Quality Health Care, and collected as Adverse Drug Reaction and Malfunction Reports under the Act on Securing Quality, Efficacy and Safety of Pharmaceuticals and Medical Devices.
- \* We have tried to ensure the accuracy of this information at the time of its compilation but do not guarantee its accuracy in the future.
- \* This information is not intended to impose constraints on the discretion of healthcare professionals or to impose obligations and responsibility on them, but is provided as a support to promote the safe use of pharmaceuticals and medical devices by healthcare professionals.
- \* This English version is intended to be a reference material to provide convenience for users. In the event of inconsistency between the Japanese original and this English translation, the former shall prevail.

Access to the most up-to-date safety information is provided via the PMDA Medi-navi service.

